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David H. Getches

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WATER MANAGEMENT IN THE UNITED STATES AND THE FATE OF THE COLORADO RIVER DELTA IN MEXICO

DAVID H. GETCHES*

The portion of the Colorado River in the United States runs through seven states – Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, and California. It then enters Mexico and passes through Sonora and Baja California, ultimately emptying into the Sea of Cortez. Before major water development, the river nourished the Delta of the Colorado River, a one-hundred-mile stretch of riparian corridor and wetlands terminating in a rich estuary. With completion of a system of large dams in the United States in the 1960s, the Delta's ecosystems changed radically. Since then, the Delta problem has been exacerbated by U.S. management of its facilities on the Colorado River. Because the United States is the upstream country, where the river is shared by seven thirsty and developing or already highly developed states, the way the United States operates its facilities on the Colorado River has enormous consequences for Mexico. Today, nearly all of the river's water is diverted for uses in the United States.

Historically, the United States has had very little regard for Mexico's interests in the Colorado River. Typically, when the United States has shown any concern about Mexico's interests, it has been the result of a crisis. The next crisis may erupt over environmental impacts of water use in the Colorado River Delta.

The United States and Mexico share an 1800-mile border.¹ There are several matters of common interest and occasional conflict: immigration, drugs, trade, and, of course, natural resource use and protection.² The Delta area that has been affected by U.S. use is below the Mexican Border, and includes the river corridor, the wetlands at Laguna Salada and Ciénega de Santa Clara, and the estuary at the Sea of Cortez. Once the river crosses the border into Mexico it threads across a wide delta. Below the border, and just above the Delta, water – sometimes the last visible flow in the channel – is taken out of the river at the Morelos Dam and transported through the Canal Central for irrigation in the Mexicali Valley. The amount of water that gets to the Mexicali Valley has rarely exceeded the minimum quantity dictated by law.³

Since the 1920s when the watershed was divided into the upper and lower basins, the United States has divided the water rights of the Colorado River among the seven U.S. states. The lower basin includes portions of California, Arizona, and Nevada. The upper basin includes land in Colorado, New Mexico, Wyoming, and Utah. The Colorado River Compact of 1922 created this dividing line to effect a

* David H. Getches is the Raphael J. Moses Professor of Natural Resources Law at the University of Colorado School of Law. He formerly served as Executive Director of the Colorado Department of Natural Resources. He is on governing boards of The Wilderness Society, Defenders of Wildlife, Grand Canyon Trust, and Rocky Mountain Mineral Law Foundation and on advisory boards for the University of Colorado Natural Resources Law Center, Utton Transboundary Resources Center of the University of New Mexico, American Rivers, and Trust for Public Land. Professor Getches is a graduate of Occidental College and the University of Southern California School of Law. He is a member of the bars of California, Washington, D.C., and Colorado.

1. See DAVID H. GETCHES, CLIMATE AND WATER: TRANSBOUNDARY CHALLENGES IN THE AMERICAS (Henry F. Diaz & Barbara J. Morehouse eds., 2003).

2. *Id.*

3. Utilization of Waters of Colorado and Tijuana Rivers and of the Rio Grande, Feb. 3, 1944, U.S.-Mex., 59 Stat. 1219 (hereinafter Treaty of 1944).

legal division of the river.⁴ Representatives of the seven states convened in Santa Fe, New Mexico, and agreed that the upper basin states would get half the water and the lower basin states would get the other half. The available data, based on fewer than thirty years of historical records, then indicated the amount of water annually available was well in excess of 16 million acre-feet.⁵ The states agreed to an interstate compact that gave each basin 7.5 million acre-feet, thereby allocating a total of 15 million acre-feet.⁶

In 1928, the U.S. Congress approved the building of the Hoover Dam. In doing so, Congress divided the total of 7.5 million acre-feet that was allotted to the lower basin among the three lower basin states, setting a numerical quantity for each state's entitlement.⁷ Later, the four upper basin states entered into another interstate compact, agreeing on percentage shares for each state of the water that is left of the upper basin's apportionment of 7.5 million acre-feet per year after delivering an annual average of 7.5 million acre-feet to the lower basin.⁸

For many years the United States resisted the idea that Mexico should be able to claim any water from the Colorado River. But in 1944, keenly aware of the value of securing good relations with a neighbor with whom it shared an 1800-mile border, the United States agreed by treaty to deliver 1.5 million acre-feet of water per year to Mexico.⁹

To enable use of the water divided among the states, an array of dams was built on the Colorado River. Ten major dams are now located on the mainstream, the largest of which are the Glen Canyon and Hoover Dams. Several more dams are located on the tributaries. Damming the Colorado River allowed for reservoir storage, the stored water of which could be conveyed across the desert to deliver water to California, and later to Arizona and Nevada.

Today, the Colorado River is a highly developed river, perhaps the most developed river in the world. Water rights have been carved up, allocating 15 million acre-feet of water among the seven U.S. states, and 1.5 million acre-feet of water to Mexico, for a total of 16.5 million acre-feet of water. However, based on studies of tree rings that indicate how much moisture was available each year in the region, the average flow over a 400-year period has been estimated to be only about 13.5 million acre-feet.¹⁰ Therefore, allocation of 16.5 million acre-feet exceeds the river's 400-year average flow of 13.5 million acre-feet.

By the time the river reaches Morelos Dam, the last dam on the Colorado River, the river usually carries only the minimum flow of 1.5 million acre-feet promised to Mexico by treaty, and Mexico takes every drop of that entitlement for farmers in the Mexicali Valley. Consequently, in the years since the U.S. dams have been completed, there were usually just braids of moist sand in the Delta where the Colorado River meets the Sea of Cortez.

4. COLO. REV. STAT. § 37-61-101 (1922).

5. GETCHES, *supra* note 1.

6. COLO. REV. STAT. § 37-61-101 (1922).

7. Boulder Canyon Project Act, 43 U.S.C. §§ 617-618 (1928).

8. Upper Colorado River Basin Compact, 81 Pub. L. 37, 63 Stat. 31 (1949).

9. Treaty of 1944, *supra* note 3.

10. C.W. Stockton & G.C. Jacoby, Jr., Long-Term Surface Water Supply and Streamflow Trends in the Upper Colorado River Basin Based on Tree-Ring Analysis (1976)(Lake Powell Research Project Bulletin 18, Institute of Geophysics and Planetary Physics, University of California, Los Angeles).

The history of relations between the United States and Mexico has been one of disregard for Mexico's interests in the Colorado River. The 1922 compact among the seven U.S. states allocated no water to Mexico, although the future possibility was mentioned.¹¹ When the United States did allocate 1.5 million acre-feet of water to Mexico by treaty in 1944, water quality was not mentioned.¹² Then, when the U.S. Congress divided water among California, Arizona, and Nevada, there was no discussion of Mexico's entitlement. As a result of the 1963 Supreme Court decision upholding that division between the three lower basin states, the United States went full steam ahead with development of the river.¹³ The mammoth dams on the river were designed to smooth out irregular flows, and hold back water for use in the United States. For many years after the dams were built, the United States took all of the available flow to fill up the empty reservoirs behind them.

Low flows of water led to terrible increases in salinity in the water that was being diverted at the Morelos Dam in Mexico. The water being used in the Mexicali Valley was so saline that it killed the crops.¹⁴ This incited an international incident, and eventually led to a solution. The response to the salinity problem was the promulgation of "minutes" – essentially amendments – to the treaty. As before, the United States responded to Mexico's concerns in a time of crisis, when the value of good relations became more obvious. The 1944 treaty, allotting a share of Colorado River water for Mexico, who previously had no share, came about in the midst of World War II, when there was a need for a safe border. The salinity minutes were accepted during an energy crisis when the United States needed to count on availability of Mexico's oil. As agreed in those minutes, the United States now must ensure that the salinity does not exceed specific, minimally acceptable levels when it reaches the border.

The next issue likely to erupt between the two nations over the Colorado River is damage to the Colorado River Delta caused by low water flows. The most obvious impacts on the Delta in Mexico are environmental problems. First, there are endangered species in the Delta in Mexico. They include the totuaba fish, the clapper rail, the desert pupfish, the willow flycatcher, and the vaquita, the world's smallest and most endangered sea mammal. Historically a fishing industry thrived in the Delta, but the fish now struggle for survival. The Delta also includes major wetlands. And the riparian corridor along the river's course in Mexico is extremely valuable for birds and other wildlife. Mexico has also established a biosphere reserve in the Delta recognized under the United Nations Man and the Biosphere program.¹⁵ Its establishment was celebrated by both Mexico and the United States. The reserve's water flows are subject to fluctuations that depend on dam and reservoir operations in the United States. There are groundwater depletion issues in the United States that also affect Mexico.

11. COLO. REV. STAT. §37-67-101 (1922).

12. Treaty of 1944, *supra* note 3.

13. *Arizona v. California*, 373 U.S. 546 (1963).

14. JO CLARK ET AL., Immediate Options for Augmenting Water Flows to the Colorado River Delta in Mexico, available at http://www.sonoran.org/pdf/Colorado_river.pdf (hereinafter Packard Report).

15. The United Nations Educational, Scientific, and Cultural Organization has designated the Alto Golfo de California, located in the northeast of Baja California and northwest of Sonora, a protected Biosphere Reserve. For further information see <http://www2.unesco.org/mab/br/brdir/directory/biores.asp?mode=all&code=MEX+10>.

Drying up the Colorado River Delta has also caused a genuine human tragedy. Indigenous peoples, the Cucupá, have lived in the Delta area since time immemorial.¹⁶ Their plight is particularly grave. When the river does not flow, the Cucupá people have to haul their daily water supplies in buckets. Their traditional occupations of fishing and farming are now nearly impossible. Many members of the tribe have moved away. Life expectancy is very short. The situation should cause shared embarrassment between the two countries about the conditions that exist there.

During several years between the mid-1980s and 2001, the Colorado River flowed into Mexico in quantities that exceeded the amount promised by treaty.¹⁷ Because there were more wet years than dry years, vegetation flourished and revitalized the habitat of birds and fish. The wetlands of the Ciénega de Santa Clara had been brought back with agricultural drainage from the United States, but other wetlands and the habitat along the 100-mile long riparian corridor of the Colorado River in Mexico rebounded to a significant extent because of the "excess" runoff in recent years. During this time, the United States simply did not have the ability to store or use any more water, nor did the Morelos diversion have the capacity to divert more water. The extra water was inadvertently given to nature, lending to a spectacular recovery of native plants and animals in the Delta area. But all the habitats now remain at risk because the "excess" flows to Mexico are only temporary under the established legal regime for managing water. Excess flows will become less frequent as water demands take more water out of the river and they will cease entirely in dry years.

The United States continues to neglect Mexico's interests in the Colorado River's management. So far, there has been little official Mexican outcry against the environmental damage to the Mexican Delta caused by water development and depletion in the United States. Nor has there been any significant sign of official U.S. concern for the problem.

A plan for recovering endangered species is being developed in the United States, known as the Multi-Species Conservation Program (MSCP).¹⁸ This is a very ambitious effort to recover endangered species and avoid driving others toward the brink of extinction. Interestingly, the plan extends over most of southern California and abruptly ends with a straight line that marks the international boundary, as if the habitats of creatures end at the United States-Mexico border.

The Bureau of Reclamation has promulgated "criteria" for allocating "surplus" waters in the river. The rules effectively allow the Secretary of the Interior to declare a "surplus" flow even when the environment is in danger and even if it would be more prudent to allow water to accumulate in reservoirs to protect against future drought.¹⁹ California has taken water in excess of its legal entitlement for

16. CARLOS VALDÉS-CASILLAS ET AL., 1998, *Wetland Management and Restoration in the Colorado River Delta: The First Steps*. Special Publication of CECARENA-ITSEM Campus Guaymas and NAWCC. Mexico.

17. Daniel F. Luecke et al., *A Delta Once More: Restoring Riparian and Wetland Habitat in the Colorado River Delta*, Environmental Defense Fund Report (1999) at http://www.environmentaldefense.org/documents/425_Delta.pdf.

18. Multi-Species Conservation Program (MSCP) for the Lower Colorado River, Arizona, Nevada, and California, 64 Fed. Reg. 27000 (May 18, 1999).

19. Colorado River Basin Project Act of 1968, Pub. L. No. 537, 82 Stat. 885 (1968).

many years.²⁰ The criteria are meant to let this continue if California takes measures to reduce its use to its legal entitlement over a fifteen-year period.²¹ Under the criteria, the Secretary may allocate water from the dams in the Colorado River to the lower basin states to allow California to continue taking more than its legal entitlement if it continues to reduce its Colorado River water use.²² The criteria ignore the Delta issue, however. California has devised a plan to scale back from its excessive water use but that plan also never mentions the Delta issue, although public officials in California are aware of it.

There are other efforts being made in California to deal with water problems. One of these efforts, CalFed, is an elaborate multi-party process that attempts to grapple with most of the major water issues in California.²³ It focuses on the delta of the Sacramento and San Joaquin Rivers at San Francisco Bay, but encompasses water planning throughout California, attempting to address a multiplicity of problems.²⁴ CalFed, however, disregards the Colorado River Delta issue.

Meanwhile, enormous time and effort are being expended on saving the Salton Sea in the Imperial Valley, near the southern border of California. The sea has been an essential habitat for birds and has sustained a rich fishery. Today it is in decline because it has received most of the return flow from the sprawling, irrigated farms of the Imperial Valley, and the salts and other chemicals in the water have made it toxic to some birds. Although in prehistoric times the Delta was geographically linked to the Salton Sea, and today it remains part of the same eco-region, the Delta issue is disconnected from the heroic efforts of the program to save the Salton Sea.²⁵

It is possible that some of the many processes for solving water problems in the United States will be expanded to deal with the Delta. The Multi-Species Conservation Program has the potential of being reopened to include habitat in Mexico, instead of unrealistically ending its area of concern at the border. Similarly, the surplus operating criteria could be revised to ensure that the Secretary did not declare a "surplus" and deliver additional water to California unless the Delta has received enough water to sustain it. But that appears highly unlikely.

Legal action could also redirect attention to the Delta's problems and change the prognosis. A lawsuit is pending in the District of Columbia to force the United States to consider the endangered species south of the border in its decision-making.²⁶ The Endangered Species Act (ESA) in the United States requires that agencies take into account impacts on endangered species and ensure that governmental actions do not jeopardize the continued existence of endangered species.²⁷ The ESA presents an opportunity to force the United States to consider the Delta in decision making processes like the MSCP and promulgation of

20. GETCHES, *supra* note 1.

21. Colorado River Interim Surplus Guidelines, 66 Fed. Reg. 7772 (2001).

22. *Id.*

23. The mission of the CalFed Bay-Delta Program is to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta. For further information see <http://calfed.water.ca.gov/>.

24. Elizabeth Ann Rieke, *The Bay-Delta Accord: A Stride Toward Sustainability*, 67 U. COLO. L. REV. 341, 341-69 (1996).

25. Jennifer Pitt et al., *Two Nations, One River: Managing Ecosystem Conservation in the Colorado River Delta*, 40 NAT. RESOURCES J. 819, 854 (2000).

26. *Defenders of Wildlife v. Babbitt*, No. 00-1544 (D.D.C. filed June 28, 2000).

27. *Endangered Species Act*, 16 U.S.C. § 1531 (2000 & Supp. 2001).

operating criteria that dictate whether and when the government will release water from federal reservoirs.

There is also hope that non-governmental entities can help find solutions. A report prepared under the auspices of the Packard Foundation identified potential sources of water in the United States and Mexico that could be used for the Delta.²⁸ This would require buying some agricultural water rights in Mexico and dedicating them to environmental uses. In the United States, a similar quantity of water would be targeted for ecological purposes and passed on for use in Mexico. The U.S. contribution would come from agricultural return flows and from reservoir releases.

The two governments have made some official efforts that could assist in remedying the Delta problem. Several years ago, a joint declaration between Mexico and the United States committed the two nations to cooperate in environmental matters. Mexico and the United States are conducting joint research and the two countries have undertaken some joint environmental programs. These efforts exemplify the kinds of cooperation that is needed to address the Colorado River Delta problem.

The International Boundary Water Commission (IBWC) has a potentially important role. The IBWC is a bi-national body that administers the 1944 treaty between the United States and Mexico and provides an institutional framework for the two nations to reach agreements and implement solutions to transboundary water problems related to the United States-Mexico Treaty.²⁹ The IBWC adopted Minute 306 to the treaty in 2000, committing the two countries to exploring cooperative efforts related to the Delta.³⁰ Pursuant to Minute 306 a bi-national symposium on the Delta was held in September 2001. The parties plan follow-up studies and cooperative efforts.

The IBWC may be called upon to assist in resolving an ongoing dispute over the Rio Grande (Rio Bravo).³¹ The two nations, acting through the IBWC, could address the Delta problem along with a settlement of the Rio Grande matter; both river systems are subject to the same 1944 treaty. For instance, resolving the Rio Grande problem, which is essentially a deficit in Mexican deliveries of water to the portion of that river that flows into Texas, may require investments in improving the efficiency of irrigation to reduce water demand on farms in Mexico in order to deliver more water to the United States. The program could be paired with a similar program in the Mexicali Valley and perhaps Imperial Valley in the United States that would make the saved water available for the Delta.

Although the challenge of finding the political and legal tools to save the Delta is great, the actual physical solution requires very little water to maintain acceptable ecological conditions. Experts in a study sponsored through the Environmental Defense Fund estimated that it would take only 30,000 to 50,000 acre-feet a year,

28. Packard Report, *supra* note 14.

29. Treaty of 1944, *supra* note 3.

30. International Boundary and Water Commission, Minute 306, Conceptual Framework for U.S.—Mexico Studies for Future Recommendations Concerning the Riparian and Estuarine Ecology of the Limitrophe Section of the Colorado River and its Associated Delta (December 13, 2000), at <http://www.ibwc.state.gov/FAO/CRDS0901/EnglishSymposium.pdf>.

31. For further discussion on the Rio Bravo issues see Alberto Szekely, *Mexico's Response to Problems Under the 1944 Treaty*, 11 U.S.-MEX. L.J. 000 (2003).

and a pulse flow of 250,000 acre-feet every five years or so to maintain healthy Delta ecosystems.³²

So far neither government has taken action although non-governmental organizations in both countries continue to press for solutions. The survival of species, riparian habitat, wetlands, and the Cucupá people are all at stake. This problem tests whether we are capable of using laws and institutions as they now exist to solve bi-national problems concerning water or whether we will continue to encounter legal obstacles and eventually have to make substantial modifications in the legal framework.

32. Luecke, *supra* note 17.

